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Development of the PTSD-Repository: A Publicly Available Repository of Randomized Controlled Trials for Posttraumatic Stress Disorder

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Given the extensive research on posttraumatic stress disorder (PTSD) treatment, a single, updatable repository of data from PTSD treatment studies would be useful for clinical, research, and policy stakeholders. To meet this need, we established a preliminary dataset of abstracted PTSD trial data, which serve as the basis for the PTSD Trials Standardized Data Repository (PTSD-Repository), maintained by the National Center for PTSD (NCPTSD). We followed systematic review methods to identify published randomized controlled trials (RCTs) of PTSD interventions. We consulted with a panel of experts to determine a priori inclusion criteria, ensure that we captured all relevant studies, and identify variables for abstraction. We searched multiple databases for materials published from 1980 to 2018 and reviewed reference lists of relevant systematic reviews and clinical practice guidelines. In total, 318 RCTs of PTSD interventions that enrolled almost 25,000 participants were included. We abstracted 337 variables across all studies, including study, participant, and intervention characteristics as well as results. In the present paper, we describe our methods and define data elements included in the data tables. We explain coding challenges, identify inconsistencies in reporting across study types, and discuss ways stakeholders can use PTSD-Repository data to enhance research, education, and policy. The abstracted data are currently publicly available on the NCPTSD website and can be used for future systematic reviews and identifying research gaps and as an information resource for clinicians, patients, and family members.

Posttraumatic stress disorder (PTSD) is a highly prevalent disorder, and its impact on health and healthcare utilization has prompted extensive research on effective ways to treat it. There have been over 300 published randomized controlled trials (RCTs) of PTSD treatments since PTSD was first included in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-III*) in 1980 (American Psychiatric Association [APA], 1980). These RCTs have evaluated a vast number of treatments and treatment modalities, including psychotherapy, psychopharmacology, and complementary approaches, and have had tremendous diversity in participant and study characteristics. Given this large and varied body of evidence, the ability to synthesize data across studies is critical

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to understanding what is and is not yet known about how well treatments work and for whom they work. Efforts to catalog and synthesize data have included systematic reviews (e.g., Hoffman et al., 2018), nonsystematic literature reviews (e.g., Kearns, Ressler, Zatzick, & Rothbaum, 2012), clinical practice guidelines (CPGs; e.g., Department of Veterans Affairs/Department of Defense [VA/DoD], 2017), and clinical trial registries, such as ClinicalTrials.gov.

Researchers, clinicians, and other stakeholders looking for a comprehensive source of PTSD trial data will find that even some of the most comprehensive systematic reviews of the PTSD literature have excluded some intervention types (e.g., complementary and integrative health) due to the prohibitively large number of studies that would have to be reviewed, abstracted, and synthesized if all interventions were included (e.g., VA/DoD, 2017). Given that the purpose of a systematic review is to synthesize the evidence to answer prespecified questions, they may also be limited in terms of the amount or level of detail of data abstracted from included studies. It is not uncommon for systematic reviews to abstract a small number of data elements either because the guiding questions do not require extensive data abstraction or because of time, staffing, or cost constraints. Systematic reviews and other synthesis efforts are also often limited to a specific period of time and are infrequently updated. For example, 7 years elapsed before the VA/DoD 2010 Clinical Practice Guideline for the Management of PTSD and Acute Stress Disorder was updated (VA/DoD, 2017).

Given that current systematic reviews of PTSD interventions have scope constraints, a researcher may need to consider multiple reviews to evaluate all interventions of interest. However, the ability to compare or combine data across systematic reviews is often limited by the heterogeneity of scope and methods. Methodological differences between systematic reviews are often well justified and well documented; for example, to save time and resources, some reviews rely on findings from previous systematic reviews (Robinson et al., 2014). Such methodologic decisions can limit the generalizability of findings because prior systematic reviews may have differed in their approach to coding data, such as combining treatment categories for analysis versus separating into discrete categories; for example, all nonpharmacologic treatments may have been grouped together rather than separating them into trauma-focused and non–trauma-focused psychotherapies (Bisson, Roberts, Andrew, Cooper, & Lewis, 2013; Brown et al., 2017). When abstracted data are made publicly available, they may be presented in a format that does not readily lend itself to reanalysis, such as a table within a PDF document, and would require reformatting or reentry. The heterogeneity of methods, scope, and data presentation across PTSD treatment–related systematic reviews has not only made synthesis across systematic reviews difficult or impossible, it has led to variation in the conclusions drawn (Cipriani et al., 2018; Stein, Ipser, & Seedat, 2006).

To better address current clinical, research, and policy needs of stakeholder groups, there is a need for a single source that provides up-to-date, detailed, comprehensive data on existing PTSD trials. Research repositories can be an efficient way to address some of the challenges of synthesizing the research on complex, broad conditions like PTSD, as is demonstrated by existing repositories for the closely related fields of depression and traumatic brain injury (TBI). A detailed repository of participant-level study data exists for TBI through the Federal Interagency Traumatic Brain Injury Research (FITBIR) Informatics System for TBI research (Thompson, Vavilala, & Rivara, 2015). Since its inception in 2011 (National Institute of Neurological Disorders and Stroke, 2011), many research teams have registered to access the publicly available data, and almost 50 studies have been published using FITBIR data (Federal Interagency Traumatic Brain Injury Research, 2019). Recently, the U.S. DoD released a large-scale, national request for proposals to analyze FITBIR data in efforts to spur more TBI research (DoD–Congressionally Directed Medical Research Programs, 2019). Separately, a large repository of study-level depression RCT data has been maintained and updated annually for the past decade (Cuijpers, 2017; Cuijpers, van Straten, Warmerdam, & Andersson, 2008). Researchers have used this database to publish more than 70 meta-analyses that have examined, for example, which psychotherapies are most effective, the efficacy of combined interventions, and the effects of specific therapies on targeted subgroups (for an overview, see Cuijpers, 2017). These successful repositories of TBI and depression data have advanced research by facilitating cross-study comparisons and have encouraged researchers to incorporate standard data elements in their studies. No such repository currently exists for trials of PTSD interventions.

The absence of a single, up-to-date, comprehensive data source on PTSD clinical trials prompted the creation of the PTSD Trials Standardized Data Repository (PTSD-Repository). The PTSD-Repository uses broad inclusion criteria, includes study-level data on a wide range of data elements, and will be updated annually. We established a preliminary repository of abstracted data and will continue to add relevant new studies as they become available. Currently, PTSD-Repository data are freely available to the public for download as Microsoft Excel (Redmond, WA) spreadsheets (https://www.ptsd.va.gov/ptsdrepository/index.asp). To enhance access to these data, the National Center for PTSD (NCPTSD) plans to develop a user-friendly online interface that will allow stakeholders to easily view, download (in multiple formats), and manipulate repository data for a variety of purposes. For example, the PTSD-Repository could (a) serve as a data source for future systematic reviews, meta-analyses, or other cross-study comparisons; (b) help to identify research gaps to determine future research priorities; (c) encourage researchers to use standard data elements or measures in their PTSD treatment research; (d) serve as a resource for clinicians seeking information on the effectiveness of interventions for PTSD in patients with particular demographic characteristics or types of trauma exposures; (e) provide the public with a place to search for evidence on interventions they or their

loved ones are considering; (f) provide policymakers with an up-to-date accounting of evidence, to facilitate quick and accurate responses to urgent government or media inquiries; and (g) augment and inform the use of existing patient education tools, such as PTSD mobile applications (NCPTSD, 2019) or the online PTSD Treatment Decision Aid available on the NCPTSD website (NCPTSD, n.d.).

An important first step in ensuring the utility of the PTSD-Repository is disseminating information about its existence and potential uses. Therefore, the aims of the present paper are to (a) describe the scope and methods for developing the PTSD-Repository; (b) define the data elements; (c) explain coding decisions and related classification challenges; (d) identify inconsistent reporting of data elements among trials; and (e) discuss potential uses of PTSD-Repository data for research, clinical, and policy purposes.

Method

We followed applicable methods guidance from the Agency for Healthcare Research & Quality (AHRQ) to search for studies, screen for inclusion, and abstract data from included studies (AHRQ, 2014). Neither risk of bias (i.e., quality assessment) nor data analysis or synthesis were conducted at this stage of the project, although a risk-of-bias assessment for all included studies is underway, with completion anticipated to occur in 2020. The full protocol for this project contains a detailed description of the methods and is available at the AHRQ Effective Health Care website (O'Neil, 2019).

Eligibility Criteria

Inclusion and exclusion criteria for studies are described in Table 1, using the PICOTS framework (Population, Intervention, Comparison, Outcome, Timing, Setting). "Population" refers to the characteristics of the patients being studied in each trial, "intervention" refers to the type of treatment, "comparison" refers to the alternative to the study intervention, "outcome" refers to the outcomes reported in the trial, "timing" refers to the duration of treatment and length of follow up of the trial, "setting" refers to the location in which the trial took place, and "study design" refers to the type of study.

Search Strategy

We searched PTSDpubs (formerly PILOTS), Ovid, MEDLINE, PsycINFO, Cochrane CENTRAL, Embase, CINAHL, and Scopus for peer-reviewed literature published between January 1980, when PTSD first appeared in the *DSM-III*, and July 15, 2018. Search strategies were dually reviewed. The search strategies for PTSDpubs and MEDLINE are provided in the full report online (O'Neil, 2019) and included search terms and MeSH headings for PTSD and known PTSD interventions. Additionally, we screened studies included in the recent VA/DoD clinical practice guideline (VA/DoD, 2017) and a recent high-quality systematic review of PTSD interventions (Hoffman et al., 2018) to identify any studies not located in our searches. We did not conduct a "gray literature" search for this project, which would include unpublished material or materials published in sources other than the medical literature, and our search was limited to RCTs published in English.

Technical Expert Panel

We convened two multidisciplinary technical expert panels (TEPs; see O'Neil, 2019, for a list of TEP members): one for pharmacologic studies, which included three experts, and one for nonpharmacologic studies, which included seven experts. The evidence-based practice center (EPC) compiled broad lists of experts in PTSD clinical trials, and the NCPTSD suggested alternates and provided recommendations for refinement. Potential TEP members were recruited based on their significant contributions to the PTSD literature, clinical expertise, and leadership in the field (e.g., involvement in clinical practice guideline development). Members were also recruited to ensure representation of a range of clinical and research perspectives on PTSD treatments, such as cognitive behavioral therapy, cognitive processing therapy, prolonged exposure, eye movement desensitization and reprocessing, health services research, and pharmacotherapy. No compensation was provided to TEP members, and all TEP members submitted AHRQ conflict of interest forms for their involvement in this project. Three conference calls with TEP members were held in April and May 2018, after which members were invited to review the draft protocol and provide written feedback. During the conference calls, TEP members were asked to provide feedback on the scope of the project, which types of data were important to abstract, which emerging interventions should be included, and their thoughts on future uses for the database. Experts assisted in defining the inclusion and exclusion criteria and offered suggestions on how to abstract and define data elements in ways that would be most useful for users of the PTSD-Repository.

In response to TEP feedback, we did not institute a sample-size threshold for inclusion given that many psychotherapeutic treatment trials, older trials, and trials investigating emerging interventions have small sample sizes but provide important preliminary evidence, on which subsequent studies build. Similarly, we did not limit studies to only those published in the past 20 years, as we initially considered. Other suggestions from TEP resulted in changes to the way we defined and abstracted data elements, including adding or augmenting variables such as sexual orientation, ethnicity (i.e., separately from race), previous PTSD treatment, exclusion of suicidal participants, level of psychotherapist training, type of index trauma, time since trauma, mean number of trauma types and events experienced, and PTSD diagnostic criteria (i.e., various editions of the *DSM* or the *International Classification of Diseases*[*ICD*]). The TEP also recommended a more detailed level of abstraction for some data elements so that future users of the PTSD-Repository will be able to identify specific subgroups of studies relevant to their areas of interest. Finally,

Table 1
Inclusion and Exclusion Criteria

Category	Inclusion criteria	Exclusion criteria
Population	Adults (≥ 18 years old) with a PTSD diagnosis (*DSM-III*, *DSM-III-R*, *DSM-IV*, *DSM-IV-TR*, *DSM-5*, *ICD-9*, or *ICD-10*) either made by a clinician or through the administration of a validated clinician-administered or patient-reported assessment tool	Children (< 18 years old) Diagnosis of acute stress disorder; studies that do not specify criteria used to diagnose PTSD Sample population with < 80% of participants diagnosed with PTSD.
Interventions	Pharmacologic treatments: Studies with any pharmacologic component, whether singly, in combination with other intervention categories, or compared with another intervention category Nonpharmacologic treatments: Interventions without any pharmacologic component, including complementary and integrative approaches, nonpharmacologic biological treatments, and psychotherapeutic treatments	Interventions designed to simultaneously treat PTSD and comorbid conditions if they cannot be standalone PTSD interventions (i.e., interventions targeting PTSD and a comorbidity such as depression are included if the intervention can be a treatment for PTSD alone) Interventions designed to prevent PTSD
Comparators	No limitations applied. Direct head-to-head comparison of PTSD interventions were included. Interventions such as waitlist/minimal attention, usual care, placebo, or other minimally-active treatment (e.g., education or attention control) were categorized as "Controls"	None
Outcomes	Any overall PTSD outcome	Studies reporting only individual symptoms or symptom clusters without overall PTSD outcome
Timing	Any study duration and length of followup	None
Settings	All	None
Study design	Randomized controlled trials	Studies that do not have a randomized controlled trial design Selected systematic reviews were considered as reference sources for studies to be reviewed for possible inclusion; however, data were abstracted from individual studies rather than from systematic reviews.
Publication language and dates	English-language publications with a publication date between 1980 and the present	Non–English-language publications Unpublished data Publication date prior to 1980

Note. DSM = Diagnostic and Statistical Manual of Mental Disorders; *ICD = International Classification of Diseases*; PTSD = posttraumatic stress disorder.

the TEP reviewed the identified studies and search strategy to determine if any relevant studies were missing.

Study Selection

Using the criteria outlined in Table 1, two reviewers screened titles and abstracts for potential inclusion. Any citation considered potentially eligible for inclusion by one reviewer was retrieved for full-text review. Two members of the study team independently conducted the full-text review, with disagreements resolved by consensus. We maintained a record of studies excluded at the full-text level along with the reasons for their exclusion (O'Neil, 2019).

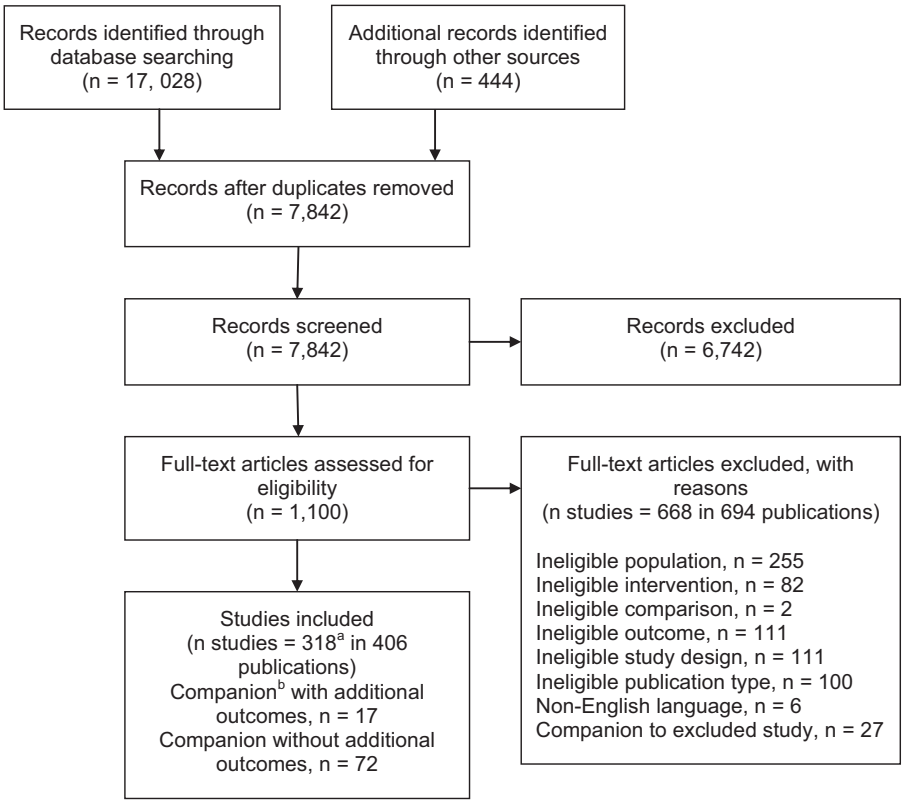

Figure 1. Literature flow diagram. [a]Badura-Brack (2015) is a single publication that includes two studies. [b]Companion papers are additional publications related to the primary publication of study findings; these papers can include information not included in the initial publication, such as protocol and subgroup analyses, reports of secondary outcomes, or analyses related to outcomes reported at additional follow-up assessments.

Data Abstraction

We constructed Microsoft Excel tables of study characteristics and key study results for all included studies. We created a data dictionary—a list of operational definitions for each data element—to guide data abstraction for this project (available in the full report appendices; O'Neil, 2019). The data dictionary and abstracted elements were determined through consultation with the TEP members and ongoing discussion with NCPTSD collaborators (Hamblen, Norman, Harik). Data were abstracted by members of the study team and reviewed for accuracy and completeness by one of the lead investigators on the Pacific Northwest EPC team (i.e., O'Neil, McDonagh, or Carlson). The methods and results are documented for each of these elements in the full report appendices (O'Neil, 2019).

Results

The search results and selection of studies are summarized in Figure 1. Database searches and examination of other sources resulted in 7,842 citations. After a review of abstracts and titles, 1,100 citations were retrieved for full-text review, and 318 studies (described in 406 publications) met inclusion criteria and were abstracted.

Abstracted Data Elements

The data abstracted from the 318 studies were classified into 337 discrete data elements related to study and intervention description, PTSD outcomes, and other outcomes and harms; these data were abstracted into detailed data tables and are available as appendices to the full report (O-Neil et al., 2019). The categories of abstracted data elements included study design, setting, country, sample size, eligibility criteria, participant characteristics, intervention characteristics, eligible results, and sources of funding. Means, standard deviations, effect sizes, and other statistics and results were abstracted from each study for included outcome variables; these data are currently available for comparison and analysis in the PTSD-Repository. The data dictionary is outlined in Table 2, which lists data elements abstracted for each data category included in the PTSD-Repository; an expanded version of this table that includes coding rules and operational definitions of the abstracted data elements is included in Online Supplementary Table 1. Users of the PTSD-Repository can reference this information to survey the available data elements. The data dictionary will also serve as a guide for data abstraction in updates to the PTSD-Repository, facilitating consistency of coding across personnel and project phases.

Table 2
Data Elements Abstracted for the PTSD-Repository

Data Category	Data elements abstracted
Study identification	First author and year of publication; AHRQ-style citation; PubMed, PILOTS/PTSDpubs database, and ClinicalTrials.gov identifiers; funding source
Study characteristics	Country; study site type (e.g., VA/DoD); clinical setting; study design; subscale or symptom cluster data reporting; subgroup analysis reporting; psychotherapeutic intervention provider training; group therapy setting; psychotherapeutic and psychotropic co-interventions
PTSD definition	Diagnostic method and score threshold used for study inclusion
Population characteristics	Number of patients; % meeting criteria for PTSD; baseline PTSD severity; PTSD symptom/diagnosis duration; % of patients in active duty military/veteran/community; mean age; gender; race; ethnicity; % treatment-naïve; % with comorbid depression, SUD, and history of TBI; inclusion of patients with suicidality; trauma type; mean number of trauma types and traumatic events experienced per patient
Study and intervention description	Intervention classification according to VA/DoD 2017 PTSD CPG; number of patients randomized to each intervention; intervention name, description, dose/session length, frequency, and duration; intervention completion/adherence definition and % meeting criteria
PTSD outcomes: measures and analysis	PTSD outcome measure name; definitions of PTSD diagnostic change and clinically meaningful response; method for handling missing data; statistical analysis type (e.g., ITT) and method; variables adjusted for primary PTSD outcome analysis
PTSD outcomes: primary outcome by group	Number of patients assessed; mean measure score; measure change score; within-group effect size; % achieved PTSD diagnostic change and clinically meaningful response
PTSD outcomes: across-group comparison	Effect sizes for primary PTSD outcome measurement, PTSD diagnostic change, and clinically meaningful response
PTSD outcomes: between-group comparison	Score difference and effect sizes for primary PTSD measure, PTSD diagnostic change, and clinically meaningful response
PTSD outcomes: secondary outcomes	Names of other PTSD measurements; baseline score; effect size for between-group score difference
Other outcomes and harms	Measurement used to assess depression, anxiety, substance use, anger, qulality of life, and functional impairment; effect size for between-group score difference; % (n/N) of SAE, WAE, and attempted and completed suicide

Note. AHRQ = Agency for Healthcare and Research Quality; PILOTS = Published International Literature on Traumatic Stress; VA = Department of Veterans Affairs; DoD = Department of Defense; PTSD = posttraumatic stress disorder; SUD = substance use disorder; TBI = traumatic brain injury; CPG = clinical practice guideline; ITT = intention-to-treat; SAE = serious adverse event; WAE = withdrawal due to adverse event.

Classification Challenges

The variation in methods, scope, and data reporting across PTSD trials led to classification challenges. Our team discussed alternatives, made group decisions about ways to classify data consistently across studies, and carefully documented our approach so future PTSD-Repository users will understand how each data element was operationalized. In general, we classified data elements into clear categories that could be applied similarly across all studies. For example, the "Trauma Type" data element was a challenge because of variation in how it was reported and described across studies. Ultimately, the types of trauma experienced by participants were grouped into 14 categories, many of which required detailed definitions and coding rules to facilitate consistent abstraction across studies. A categorization of "mixed" indicated that the study allowed for participants with different types of trauma and could include any combination of the other categories; when a study was classified as mixed, each included category was also listed for the study. "Community/school violence" was defined to include bullying, physical abuse and assault, gang-related violence, interracial violence, police and citizen altercations, mass shootings, homicide, and other trauma types. An additional challenge in classifying trauma type was that in studies that included military service members, it was not always clear whether a trauma occurred during, before, or after military service. In these cases, to receive a classification of military sexual trauma or combat-related trauma, we chose to require that manuscripts explicitly state that traumatic events occurred during military service.

In the most complex cases, we were not able to abstract data into easily comparable categories and instead relied on the abstraction of study-reported descriptions of data elements in a qualitative manner. For example, outcome-related

Table 3
Number of Studies Reporting Data Elements in Pharmacologic and Nonpharmacologic Studies in the PTSD-Repository

	Pharmacologic studies ($n = 106$)		Nonpharmacologic studies ($n = 212$)	
Evidence category and data element	*N*	%	*N*	%
Study characteristics				
Psychotherapeutic treatment provider education level	n/a	n/a	152	71.7
Allowed PTSD or other psychotherapy cointervention	45	42.5	119	56.1
PTSD diagnostic score threshold for study inclusion	92	86.8	121	57.1
Population characteristics				
Duration of PTSD symptoms	49	46.2	77	36.3
Comorbid TBI	12	11.3	20	9.4
Comorbid SUD	86	81.1	116	54.7
Number of trauma types per participant	2	1.9	19	9.0
Number of traumatic events per participant	4	3.8	40	18.9
Intervention characteristics				
Definition of treatment completion or adherence	29	27.4	93	43.9
Percent who adhered to (pharmacologic) or completed (nonpharmacologic) treatment	8	7.5	89	42.0
PTSD outcomes				
Within-group effect size or *p* value	24	22.6	131	61.8
Score difference from baseline between groups	38	35.8	29	13.7

Note. n/a = not applicable; PTSD = posttraumatic stress disorder; TBI = traumatic brain injury; SUD = substance use disorder.

categorizations of participant loss of diagnosis, remission, and clinically meaningful change were operationalized inconsistently across studies. To include findings related to these important data elements, we based data abstraction on the definition used in each study rather than on a common data element definition across studies. Similarly, studies often did not distinguish harms from negative outcomes (i.e., unintended adverse consequences of treatment vs. lack of treatment efficacy) nor did they consistently report harms or adverse events, particularly in relation to suicide, suicidal ideation, and psychiatric hospitalization, across studies.

Determining which assessments represented a study's primary PTSD outcome and which represented secondary outcomes was difficult for some studies in which multiple outcome measures were reported. In some instances, the RCT may have analyzed a primary outcome other than PTSD, such as anxiety or sleep. However, provided that a study reported an overall PTSD outcome, the study was included to ensure a systematic and comprehensive presentation of all available PTSD RCT data. To standardize abstraction methods across studies, we gave preference to validated clinician-administered measures as primary PTSD outcomes; a description of the full decision-making hierarchy is included in the full report appendices, which are available online (O'Neil, 2019).

Inconsistent Reporting of Data Elements

Most studies did not provide information for all data elements contained in the PTSD-Repository. For example, some studies reported outcomes as a change from baseline between intervention groups, whereas others reported only endpoint differences between groups or the within-group change from baseline. Additionally, although the TEP recommended including certain demographic variables, some, such as sexual orientation and gender identity, were rarely reported in studies. Most studies neither clearly nor comprehensively reported details about side effects or adverse events, such as death or suicidality. In all cases, an entry was made for each data element, although many cells were labeled "not reported," for consistency in data elements across the studies. This structure also allows us to highlight areas in need of additional focus and/or reporting in future RCTs.

There was variation in elements of data reporting for pharmacologic versus nonpharmacologic studies. Table 3 displays the prevalence of data reported on select variables for pharmacologic and nonpharmacologic studies. These data elements were selected with TEP guidance based on their relevance to current research and clinical practice. Several data elements were often missing from both types of studies. For instance, the prevalence of prior TBI among participants was reported in 9.4% of nonpharmacologic and 11.3% of pharmacologic studies. However,

54.7% of nonpharmacologic and 81.1% of pharmacologic studies reported substance use–related comorbidities. Additionally, almost no pharmacologic studies (3.8%) reported the mean number of traumatic events experienced by participants.

Discussion

With the goal of creating a comprehensive repository of PTSD trials, NCPTSD, AHRQ, and Pacific Northwest EPC partnered to conduct a systematic compilation and abstraction of PTSD RCTs. This project produced the data tables that serve as the basis for the PTSD-Repository, a publicly available database of RCTs of PTSD interventions. The PTSD-Repository includes more than 337 descriptive data elements from 318 PTSD trials; to our knowledge, it is the single largest repository of PTSD clinical trial data to date. To ensure that the PTSD-Repository remains relevant and comprehensive, NCPTSD will oversee an annual update wherein newly published studies and additional variables will be added to the repository.

With input from the TEP, we purposefully selected broad inclusion and exclusion criteria to maximize the number of included PTSD RCTs. Although this work focused exclusively on single-disorder PTSD treatments, we set no other limits on the nature of the intervention or comparator, treatment duration, or clinical setting (e.g., outpatient, residential) in which treatment was delivered. As a result, the PTSD-Repository includes information on a diverse array of interventions, including biological treatments, such as transcranial magnetic stimulation, and neurofeedback; complementary and alternative approaches, such as yoga and acupuncture; psychotherapies, such as cognitive therapy and virtual reality exposure therapy; pharmacologic interventions, such as sertraline, tiagabine; and multicomponent interventions, such as MDMA-assisted psychotherapy and prolonged exposure plus D-cycloserine. Whereas prior PTSD-related reviews have excluded at least some of these intervention types (e.g., Hoffman et al., 2018), the PTSD-Repository allows for comparisons across all randomized PTSD trials.

The data tables that serve as the basis for the PTSD-Repository (https://www.ptsd.va.gov/ptsdrepository/index.asp) are more extensive than evidence tables created for a typical systematic review, reflecting the objective of displaying detailed data elements that will be translated into an interactive database formatted for public use. As shown in Table 2, the extensive list of abstracted variables includes study and population characteristics, outcomes pertaining to PTSD symptoms, and effect sizes for other outcomes (e.g., depression, substance use disorder, anger). To ensure consistent and comprehensive abstraction of data elements, we developed standard conventions for recording and classifying data (i.e., abbreviations, data formatting) as well as detailed data abstraction instructions. Whereas repositories for other disorders have sometimes relied on study investigators for data entry (Thompson et al., 2015), we used a centralized data abstraction team to reduce bias and variability, thereby enhancing standardization and comparability of the compiled data. The careful standardization of variables and large number of abstracted data elements has resulted in rich data tables, which will allow for in-depth analysis of included trials by a variety of stakeholders in the future.

Just as clinical trial repositories for other conditions have accelerated research in their domains (e.g., Cuijpers, 2017; Thompson et al., 2015), it is our hope that the PTSD-Repository will spark future research, collaboration, and innovation in the field of PTSD. By making these carefully abstracted RCT data available to researchers, the PTSD-Repository has the potential to greatly simplify the process of conducting and updating systematic reviews or meta-analyses, thereby increasing the speed of research and reducing associated costs. Data in the PTSD-Repository can also be used for exploratory analysis and testing new hypotheses. Researchers can draw descriptive and quantitative comparisons across intervention types or focus on specific interventions or populations to conduct subgroup analyses to provide, for example, data on what works for whom. The PTSD-Repository can also shape the ways future trials are designed and their results reported; when determining which variables or measures to include in future studies, investigators can look to the PTSD-Repository to identify a core set of standard, common variables or measures to facilitate cross-study comparisons. Additionally, analyses of gaps in the existing research can inform future research and policy priorities. For example, gap analyses could help highlight clinically relevant outcomes that have not been commonly reported in the PTSD RCT literature and encourage future research endeavors that emphasize these outcomes.

In addition to advancing research, the PTSD-Repository has the potential to serve a variety of clinical, educational, and policy purposes. An early version of the PTSD-Repository has already been used by the PTSD Consultation Program (T. McKee, personal communication, May 17, 2019); this program, funded by NCPTSD, provides free clinical and educational consultation to providers who treat veterans with PTSD. The data contained in the PTSD-Repository enabled program staff to quickly and accurately answer questions about PTSD treatment completion and response rates. Additionally, the NCPTSD website is designed to be a resource for patients and families affected by PTSD and has integrated information from the PTSD-Repository via a front-page link to the Clinical Trials Database. We expect that the repository will continue to be of use to the PTSD Consultation Program as well as to other educational programs and clinicians or educators seeking more information on PTSD treatments.

The PTSD-Repository could also serve as the foundation for systematic reviews and meta-analyses that inform future CPGs. As noted by Hamblen et al. (2019), in the past 6 years, there have been five major CPGs released for PTSD (APA, 2017; International Society for Traumatic Stress Studies, 2018; National Institute for Health and Care Excellence, 2018; Phoenix Australia Centre for Posttraumatic Mental Health, 2013, VA/DoD, 2017). The differences in guideline development procedures and the scope and methods used by the systematic reviews on

which the CPGs are based have led to variation in recommendations for some second-line psychotherapies and in the strength of the pharmacotherapy recommendations (see Hamblen et al., 2019). The PTSD-Repository could improve the consistency and comprehensiveness of systematic reviews and CPGs in the future.

The main limitation of the present work to date is that the PTSD-Repository lacks risk-of-bias and quality assessments of the included studies. This will be an important element of future systematic reviews and meta-analyses based on repository data (Appelbaum et al., 2018; Moher, Liberati, Tetzlaff, & Altman, 2009); as such, a risk-of-bias assessment is currently underway as part of the first annual update to the PTSD-Repository. Following AHRQ guidance (Viswanathan et al., 2017), a risk-of-bias rating will be assigned to each of the 318 studies described in this manuscript as well to newly identified studies that are added to the updated review. In addition, the PTSD-Repository does not yet include interventions designed to simultaneously target PTSD and comorbid diagnoses (e.g., Norman et al., 2019), preventive interventions (e.g., Zohar et al., 2018), nonrandomized study designs, unpublished literature, or trials published in a language other than English. These studies will be considered for future iterations of the repository, which will have an expanded scope.

We could not accommodate the abstraction of PTSD symptom cluster outcomes due to time and resource constraints. However, to prepare for possible future stages of this project, we indicated which studies reported item- and symptom-level outcomes. We also were not able to include individual participant-level data given that this information is not typically included in published literature. Other data we would have liked to include were more granular labeling of the interventions into common intervention categories (e.g., trauma-focused, cognitive behavioral), treatment fidelity, inclusion criteria related to comorbid mental health conditions and suicidality, and more detailed abstraction of harms and adverse events. These variables are under consideration in the annual update of the PTSD-Repository.

The PTSD-Repository will be updated and expanded on an annual basis. Decisions regarding variables and interventions that will be added during annual updates will be based on PTSD clinical trial data available in the evidence base, input from panel experts, and suggestions from PTSD-Repository users. The completion of the data tables and summary report (O'Neil, 2019) signifies the end of the first development phase of the PTSD-Repository. The data tables are currently available to view or download as Microsoft Excel spreadsheets via the NCPTSD PTSD-Repository website (https://www.ptsd.va.gov/ptsdrepository/index.asp). The NCPTSD will create the anticipated searchable, interactive, web-based interface for the PTSD-Repository as part of a future stage of this project, using these tables as a foundation. This user-friendly interface will better allow the public to access and understand the data. For example, basic figures and summary statements will be presented with web-based data tables, and these figures and summary statements will not require data management or manipulation expertise. The presentation of these figures and summary statements for key data elements will be written in plain language so that they can be accessible to individuals at a variety of levels of health literacy. Additionally, basic searches for key data elements will be possible by selecting variables of interest, such as all studies on women or all studies on women for a certain year or timeframe. These subgroup results will then be displayed in basic tables and figures.

Overall, the PTSD-Repository is designed to support a variety of stakeholders, including clinicians, policymakers, researchers, patients, and caregivers or family members. These key stakeholder groups can then use the PTSD-Repository to help with selecting treatments, understanding the potential benefits and harms of different treatments, making clinical policy decisions, and designing future research. It will provide up-to-date information on evidence from PTSD RCTs in an accessible format and offer a place to search for evidence on specific interventions, including the participant characteristics and settings in which they have been studied. The repository will help stakeholders identify which treatments, variables, and patient or participant populations have not been studied. The PTSD-Repository is positioned to play a major role in facilitating scientific discovery, enhancing knowledge transfer between PTSD researchers, and improving public understanding of PTSD treatment.

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